



# Financial Literacy and Retirement Planning in Kazakhstan

Sang H. Lee <sup>a,\*</sup>, Ayakoz Kuttyzholova <sup>b</sup>

*a KIMEP University, 2 Abai Avenue, Almaty, Kazakhstan*

*b Kazakh Academy of Architecture and Civil Engineering, Almaty, Kazakhstan*

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## ABSTRACT

Financial literacy level of Kazakhstan is measured using internationally standardized basic questions to compare with other countries previously studied. The level in Kazakhstan is alarmingly low compared to advanced countries. The most vulnerable groups are identified as female with no business education and lower income. The relationship between the financial literacy and retirement planning indicates that both variables are jointly determined, i.e. the higher is the literacy scores the more likely planned retirement and vice versa. This result indicates the importance of government efforts to promote the financial literacy level of the most vulnerable groups for the successful implementation of the recent pension reform which emphasizes more on the individual responsibility for the retirement.

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\*Corresponding Author:

[shlee@kimep.kz](mailto:shlee@kimep.kz)

## **1. Introduction**

Previous studies report that financial literacy levels among respondents of surveys are alarmingly low in many countries. In particular, the young and the old age segments, women, and less-educated groups are vulnerable in financial transactions and decision-making due to their financial illiteracy (see survey of literatures in Lusardi and Mitchell, 2014). More importantly, the low level of financial literacy is linked to poor financial planning and retirement planning in these studies [for example, Rooij, et. al. (2011) for Netherlands, Bucher-Koenen and Lusardi (2011) for Germany, Lusardi and Mitchell (2011) for U.S., Klapper and Panos (2011) for Russia, Agnew et. al. (2013) for Australia, Johansson, et. al. (2014) for Sweden, Clark, et. al. (2014) for U.S., and Boisclair, et. al. (2014) for Canada]. Majority of studies linking the financial literacy to retirement planning, however, focus on developed countries where financial market and investment instruments are well developed and reasonable levels of social safety nets for the most vulnerable groups are already instituted. On the other hand, this issue has not been investigated rigorously for developing or transition economies such as Kazakhstan where economies are more volatile and retirement risks are higher. In addition, a new pension reform is enacted recently in Kazakhstan to emphasize more individual responsibility for retirement planning.

Since the independence in 1991, Kazakhstan experienced several severe economic challenges including banking and currency crises as well as hyperinflation. On the other hand, it enjoyed double digit economic growth during the period of accelerating oil price started in early 2000 until the third quarter of 2008. In June 2013, the country introduced a pension reform on the existing fully-funded mandatory defined contribution system which had been severely weakened after the global financial crisis. The reform measures consolidate all privately managed funds into one unified fund managed by the state and set the schedules to increase retirement age gradually. The main reason for the reform was the concern about the

ability of pension funds to provide payments at an acceptable level in the long run since the returns managed by the private pension funds had been significantly below the inflation rate for the past years. Although this reform resulted in many controversies and national debates, it became an excellent opportunity for the public to be informed of the importance of retirement planning early on. The next step that the government needs to target will be providing appropriate education for the citizen to make prudent financial decision including retirement planning.

In this regard, this study assesses the level of financial literacy for Kazakhstan and compares it with those of other countries reported in previous studies. In addition, the study identifies the most vulnerable group in financial literacy and retirement planning so that the policy makers can provide measures to improve the well-beings of these groups upon retirement. Finally, the study attempts to find linkage and causality between financial literacy and financial retirement planning. The results show highly consistent patterns observed in other countries but with substantially lower performances for all types of questions compared to the developed countries. And it finds that the financial literacy and retirement planning are jointly determined using analysis with instrumental variable approach. These results may be able to provide valuable implications for the further development of Kazakhstan's pension system and promoting the well-being of its people in the long run.

The following section summarizes previous studies focusing on the financial literacy and retirement planning. A description of the survey questionnaire and summary statistics are presented next followed by analysis of the survey results linking to retirement planning. A conclusion and policy implication are in the last section.

## 2. Literature Review

The following review focuses on the studies utilizing the internationally-standardized, basic financial literacy questions covering the understanding of interest rate compounding, impact of inflation on the purchasing power, and risk diversification in investment in the survey questionnaire. These three questions have been used many other international studies, and internationally comparable results are produced thereafter. The questions are initially developed by Lusardi and Mitchell (2005) in their survey study of 2004 Health and Retirement Study (HRS), and the exact wording of questions is as follows:

- (1) Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? Answer to choose from More than \$102, Exactly \$102, and Less than \$102.*
- (2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?*
- (3) Do you think that the following statement is true or false? "Buying a single company's stock usually provides a safer return than a stock mutual fund."*

The authors find that 67 percent of survey respondents answered correct on the interest question whereas 75 and 52 percent correct on the inflation and risk diversification questions, respectively. Only 34 percent answered correct for all three questions, and they conclude that financial illiteracy is widespread among Americans of 50 years and older. More importantly, they find financial literacy is strongly and positively associated with retirement planning. Especially, knowledge about risk diversification best differentiates between the sophisticated

and the unsophisticated, and it has much larger marginal effect than the other two questions on the retirement planning. In a similar study by Lusardi and Mitchell (2011), the authors find the similar results acquired among the older people in the 2004 HRS survey. About 65 and 64 percent of respondents answered correctly on the interest and inflation questions, respectively. However, similar to the older group, 52 percent of the sample can answer correctly on the risk diversification question. In addition, they find that financial literacy level is particularly low among the young, women, and the less-educated in the U.S. Moreover, Hispanics and African-Americans score the least well on financial literacy concepts. Interestingly, however, all groups rate themselves as rather well-informed about financial matters, notwithstanding their actual performance on the key literacy questions. Using the number of years in state mandated high school financial education as an Instrument Variable, they also find that the instrumented financial literacy variable significantly and positively affects the retirement planning. Van Rooij et al. (2011) find a better performance on the basic literacy questions in Netherlands compared to the results in the U.S. About 75 percent and more than 80 percent of respondents answered correct on the interest and inflation questions, respectively. On the risk question, the performance is somewhat lower than the results of the U.S. showing less than half of the respondents answered correct. They find that most household lack knowledge of fundamental financial concepts and there exist vast differences in knowledge among respondents. In particular, women and the less-educated display lowest level of financial knowledge. They also find a strong and positive relationship between financial knowledge and retirement planning. Using information on economics education acquired in school as an Instrumental Variable, they show that the nexus of causality goes from financial literacy to planning rather than the other way around. Bucher-Koenen and Lusardi (2011) compare the financial literacy levels of East and West Germany, and find that the level in Germany is similar to the results of Netherlands and higher than the U.S., showing 82.4 percent of respondents answered correct on the interest question whereas 78.4 percent and 61.8 percent

answered correct on the inflation and risk diversification questions. They find that the basic financial literacy level is relatively lower among women, the less educated, and those living in East Germany. The lower performance in East Germany is evident even when controlling for differences in socioeconomic background. More importantly, they find that the financial literacy has an important positive effect on individual's planning for retirement, but not the other way around. Klapper and Panos (2011) analyze the national survey on the financial literacy for 1,400 Russian individuals. They find that only 36 percent of the respondents understand the workings of compound interest and about half of the sample can answer correctly on the inflation question. The general respondents perform the worst in answering the risk diversification question showing only 12.8 percent correct. They find that the literacy level is significantly lower than other countries and significantly and positively related to retirement planning. Agnew et al. (2013) analyze the relationship between financial literacy and retirement planning in Australia. They find about 83 percent answered correct on the interest question while 69 percent correct on the inflation question. On the risk diversification question, the correct answers take about 55 percent of the full sample. Overall, they find aggregate levels of financial literacy similar to comparable countries that the young, least educated, those not employed, and those not in the labor force are most at risk. They find that financial literacy has been shown to relate to important financial behaviors such as retirement planning. Boisclair et al. (2014) find consistent evidences among Canadians on the literacy level which can be found in other countries, and rank Canada better than America, but worse than Germany. The proportions of correct answers on the interest and inflation questions are 78 percent and 66 percent, respectively. The performance on the risk diversification question results somewhat higher level compared to other countries except Germany, showing more than 59 percent. In particular, they find the similar evidences with other countries that the young and the old, women, minorities, and those with lower educational attainment do worse. Also, they conclude that the retirement planning is strongly associated with financial literacy

and present evidences that those who answered correct on basic literacy questions show significantly higher probability of having retirement savings

A comprehensive literature review on the financial literacy vs. retirement planning, wealth accumulation, and consumer behavior as well as an assessment of financial literacy program can be found in Lusardi and Mitchell (2014). They consider financial knowledge as a form of investment in human capital, which may have optimum level to achieve for each individual given heterogeneity of costs and benefits perceived by that person. In their survey of existing studies, they find evidences that the low literacy levels are pervasive around the world, especially in old and young populations, although most participants in the surveys are confident of their financial knowledge without recognizing their own shortcomings. They also find evidences of heterogeneity in literacy levels due to differences in gender and races, income and work status, education levels and family background, and hometown. In assessing the link between the literacy levels and financial behaviors, they conclude that more financially literate people make more and better money decisions and retirement planning, and less financial mistakes and herd behaviors.

Overall, majority of previous studies indicate that there is a positive relationship between financial knowledge and retirement planning. A person with higher level of financial knowledge is most likely prepared better for his or her retirement.

### **3. Data and Descriptive Analysis**

In March 2014, 25 student-groups conducted paper-and-pencil surveys of financial literacy across cities and villages of Kazakhstan. Eliminating answer sheets with significant missing values, a total of 830 answers are collected. All collected answers had completed at least the basic three literacy questions and the question on retirement planning. Out of 830 respondents, the percent of correct answers on these three basic questions are 59 percent, 55

percent, and 39 percent for interest, inflation, and risk diversification questions, respectively. Twenty percent of total sample responded correct on all three questions, and 18 percent was unable to provide any correct answers on the basic questions. The similar statistics for international comparisons are provided in Lusardi and Mitchell (2014), and the following table shows a comparison between the information in Lusardi and Mitchell and the survey results of Kazakhstan.

The level of financial literacy in Kazakhstan is considerably low compared to other countries except Russia as shown in Table 1. In the interest question, Kazakhstan underperforms by 6 percentage points compared to the U.S. and by 24 percentage points compared to Australia, but performs better by 23 percentage points compared to Russia. The lower performances are similar in inflation question by showing 9 - 25 percentage points lower compared to western countries and Australia, but 4 percentage points higher than Russia. Kazakhstan's performance on risk diversification question is the lowest among three basic questions as similarly shown in other countries, underperforming by 9 to 23 percentage points compared to western countries but scoring 26 percentage points higher than Russia. The probability of answering all three questions correct is 20 percent which is 15 to 33 percentage points lower than western countries but 17 percentage points higher than Russia. The probability of "None correct" is 18 percent in Kazakhstan which is 7 - 9 percentage points higher than western countries but 10 percentage points lower than Russia. For the ratios of "All 3 correct" to "None correct", Germany shows the highest, 5.3 times, followed by Australia (4.8), Canada (4.2), Netherlands (4.18), U.S.A. (3.5), Kazakhstan (1.1), and Russia (0.1). Although not in the above table, the highest ratio can be found for New Zealand (6.8), and additionally, the ratios for Sweden (2.5), Japan (1.6), and Italy (1.4) can be found in Lusardi and Mitchell (2014).



**Table 1**

International Comparisons on the Financial Literacy (The Percent of Correct Answers on the Basic Literacy Questions)\*\*

Country	(1) Interest	(2) Inflation	(3) Risk	All 3 Correct**	None Correct**
<b>U.S.A.</b>					
All sample	65%	64%	52%	35%	10%
Older than 50 Yrs	67%	75%	52%	34%	10%
Employees in Financial Co.	76%	92%	88%		
<b>Germany</b>					
All sample	82%	78%	62%	53%	10%
West Germany*	85%	82%	66%	58%	
East Germany*	78%	70%	54%	45%	
<b>Netherlands</b>	75%	80%	48%	46%	11%
<b>Australia</b>	83%	69%	55%	43%	9%
<b>Canada</b>	78%	66%	59%	42%	10%
<b>Russia</b>	36%	51%	13%	3%	28%
<b>Kazakhstan</b>	59%	55%	39%	20%	18%

\* Simple average of four different age groups in Table 3 of Bucher-Koenen et al. (2011)

\*\* Excluding Kazakhstan, the data are adopted from Lusardi and Mitchell (2014)

Kazakhstan, East Germany, and Russia experienced a similar transition period to become market economies, and survey respondents perform relatively poorer compared to other countries which have long history of market economy, financial education, and advanced financial markets. Interesting results from this table are, first, America shows lower scores in all questions compared to East Germany, and second, Russia shows lower performance in all questions compared to Kazakhstan. The long history of market economy, financial education and the advanced level of size and quality of financial market may not be able to explain fully the difference in financial literacy levels.

Focusing on the Kazakhstan results, the following Table 2 shows percentage of correct answers on these basic questions given different profiles of the respondents. Respondents are classified into 7 basic profiles including gender, ethnic group, hometown, marital status, business education, income, and retirement planning. Each profile is then divided into different classes. The number in "Count for class" represents total number of responses for each class, and the number in parenthesis represents total number of correct answers or none correct on all three questions. The last two columns provide the difference in mean scores on

all three questions between or among classes within a profile group. The differences are estimated using dummy variable approach, and therefore, they represent partial significance level holding all other variables constant.

In this table, variables representing Gender, Business Education, Income, and Retirement Planning status show significant differences among different classes. Gender difference in financial knowledge was significant in most of previous studies. The result is similar in Kazakhstan when no other profile factors are considered. Compared to female, male respondents have higher probabilities of providing correct answers on interest, inflation, and all three questions and marginally lower probability for correct answers in risk diversification question. In addition, male respondents show lower probability of “None Correct” to all three questions compared to female. The mean scores are 1.454 and 1.594 out of total 3 points for female and male, respectively, and the difference is significant at 5 percent level.

**Table 2**

Distribution of Correct Responses to Basic Literacy Questions and Statistical Difference between Classes  
(Percent out of headcount of class)

Profiles	Class (Headcount)	Interest Rate (486, 58.6%)	Inflation (458, 55.2%)	Risk (321, 38.7%)	All 3 Correct (166, 20.0%)	None Correct (152, 18.3%)	Mean Score	Difference (p-Value)
<b>Gender</b>	Female (414)	56.3%	50.0%	39.1%	19.1%	21.0%	1.454	
	Male (416)	60.8%	60.3%	38.2%	20.9%	15.6%	1.594	0.14 (0.046)**
<b>Ethnic Group</b>	Kazakh (502)	56.6%	53.6%	40.6%	18.9%	17.5%	1.508	
	Russian (150)	62.0%	57.3%	34.0%	23.3%	22.0%	1.533	0.025 (0.787)
	Others (178)	61.2%	57.9%	37.1%	20.2%	17.4%	1.562	0.054 (0.541)
<b>Hometown</b>	Villages (510)	57.1%	54.7%	36.3%	19.4%	20.4%	1.480	
	Cities (320)	60.9%	55.9%	42.5%	20.9%	15.0%	1.593	0.113 (0.115)
<b>Marital Status</b>	Single (412)	53.9%	55.1%	38.1%	19.4%	19.7%	1.471	
	Non-Single (418)	63.2%	55.3%	39.2%	20.6%	17.0%	1.577	0.106 (0.131)
<b>Business Education</b>	None (265)	44.2%	49.4%	23.8%	9.1%	26.0%	1.174	
	Less than 1 yr (165)	53.3%	50.9%	34.5%	11.5%	20.0%	1.388	0.214 (0.02)**
	Less than 2 yr (175)	66.9%	53.7%	49.7%	24.6%	14.9%	1.703	0.529 (0.00)***
	More than 2 yr (225)	72.9%	66.2%	50.7%	35.6%	10.7%	1.898	0.724 (0.00)***
<b>Income</b>	None (246)	52.8%	50.0%	32.9%	15.0%	23.2%	1.358	
	Less than \$25K (410)	60.7%	52.2%	38.3%	19.0%	18.5%	1.512	0.154 (0.05)*
	More than \$25K (174)	61.5%	69.5%	47.7%	29.3%	10.9%	1.788	0.43 (0.000)***
<b>Retirement Planning</b>	No Plan (256)	47.7%	48.4%	32.8%	14.8%	25.4%	1.289	
	Will Plan (241)	63.5%	58.5%	44.4%	22.0%	16.2%	1.664	0.375 (0.00)***
	Already Planned (333)	63.4%	58.0%	39.0%	22.5%	14.4%	1.604	0.315 (0.00)***

The significance levels are represented as \* for 10%, \*\* for 5%, and \*\*\* for 1% levels

Factors such as differences in ethnicity, hometown, and marital status are not shown significant relationship with financial literacy level in Kazakhstan although they are important variables in other studies. The amount of business education, however, seems to have significant positive impact on the financial literacy. The performance gap between the groups of no education and more than two years of education is 0.72 point (i.e. education improves almost 62 percentage points higher score). The highest gap between these two groups can be found in the interest question, showing less than 50 percent correct in the former and more than 70 percent correct in the latter class. In addition, only nine percent answered all three correct and about 26 percent could not provide any correct answers in the no business education class. The “More than 2 years” class shows opposite figures, 36 and 11 percents, for “All 3 Correct” and “None Correct”, respectively. It implies how important it is to have business education in understanding the basic financial issues. For the financial industry and financial intermediaries in Kazakhstan, it is very important to explain fully to their clients about the implications of interest rate compounding, inflation and risk diversification issues when marketing the new financial instruments and services.

Kazakhstan’s per capita income is relatively low compared to the countries studied previously on the financial literacy issues. At the end of 2013, the per capita income in Kazakhstan was close to \$13,000 based on the average exchange rate before the devaluation in February 2014. Therefore, those families with two income earners make approximately \$25,000 per year. In this survey, 21 percent of respondents answered that their income is more than \$25,000, and can be considered as upper middle class since majority of respondents’ incomes are less than that amount. High income earners perform significantly better than low income earners. The income may have positive influence on the financial literacy, possibly due to more frequent consultations and discussions on the money and finance issues by high income earners. It may also be true that those who are knowledgeable

on the financial matters make more income. This means that income and financial literacy may be determined jointly as other studies suggested [Jappelli and Padula (2013) for example].

The retirement planning status also shows significant positive relationship with financial literacy level. The “Will plan” and “Already planned” groups show similar levels of correct answers and are significantly better performed compared to “No plan” group which shows lowest level of correct answers and highest level for the “None correct” column. It may indicate that those who already planned and thinking about retirement plan probably learn more about financial issues and perform better in the literacy survey. In previous studies, however, the direction of causality is opposite, showing that financial literacy positively affects the retirement planning, not the other way around.

The following Table 3 shows the distribution of retirement planning status among different profiles of respondents. The last three columns present results of regressions of retirement planning status (0 for “No plan,” 0.5 for “Will plan,” and 1 for “Already planned”) on dummy variables of each class. Among those who have no retirement plan, the ratio for the female-to-male is 1.4 (35.99%/25.72%). This ratio becomes close to one in “Will plan” group, and 0.8 in the “Already planned” group. The difference between female and male is significant by the information in the last three columns. On the other hand, the difference is not significant among different ethnic groups although Kazakh ethnic group has the highest percentage in “Already planned”.

Those whose hometowns are cities have substantially lower probability in “Already Planned,” but higher probability in “Will Plan” columns. The village residents already own houses and domestic animals probably consider those assets as investments for retirement, and it is reasonable to think that more renters reside in cities rather than villages. Married (or

non-single) people plan substantially better on their retirement compared to single group. Increased responsibility coming along with marriage might have promoted better retirement planning for married people.

**Table 3**

Distribution of Retirement Planning Status among Different Classes and Statistical Difference between Classes  
(Percent within its own class)

Profiles	Class	Count for Class	No plan (256)	Will plan (241)	Already planned (333)	Coefficient	Difference between Class	Difference between Class (p-Value)
Gender	Female	414	35.99%	28.26%	35.75%	0.499		
	Male	416	25.72%	29.81%	44.47%	0.594	0.095	0.001 ***
Ethnic Group	Kazakh	502	30.28%	27.09%	42.63%	0.562		
	Russian	150	34.00%	29.33%	36.67%	0.514	-0.048	0.787
	Others	178	29.78%	34.27%	35.96%	0.531	-0.031	0.541
Hometown	Villages	510	30.00%	25.88%	44.12%	0.571		
	Cities	320	32.19%	34.06%	33.75%	0.508	-0.063	0.036 **
Marital Status	Single	412	41.26%	30.10%	28.64%	0.437		
	Non-Single	418	20.57%	27.99%	51.44%	0.654	0.217	0.000 ***
Business Education	None	265	32.08%	27.92%	40.00%	0.540		
	Less than 1 yr	165	31.52%	23.64%	44.85%	0.567	0.027	0.512
	Less than 2 yr	175	39.43%	31.43%	29.14%	0.449	-0.091	0.025 **
	More than 2 yr	225	22.22%	32.44%	45.33%	0.616	0.076	0.044 **
Income	None	246	48.78%	34.96%	13.01%	0.305		
	Less than \$25K	410	26.59%	26.59%	46.83%	0.601	0.296	0.000 ***
	More than \$25K	174	10.92%	26.44%	62.64%	0.759	0.454	0.000 ***
Basic Literacy Score	Score 0 - 1	339	62.24%	51.92%	30.68%	0.505		
	Score 2 - 3	491	9.16%	13.24%	46.64%	0.587	0.082	0.005 ***

The significance levels are represented as \* for 10%, \*\* for 5%, and \*\*\* for 1% levels

In general, business education of more than two years is associated with better retirement planning, but the coefficient for less than two years of education is significantly negative in the dummy variable regression. The level of income significantly affects the retirement planning. The higher the income a respondent makes, the better he or she plans for the retirement. The financial literacy level also affects the retirement planning significantly positively. The low-scored class has more than double probability of having “No plan” compared to “Already planned,” while the high-scored group show an opposite result.

Overall, gender, hometown, marital status, business education, income, and literacy level are important variables for the retirement planning when these variables are considered independently. Once compounding effects are considered among these factors in a multiple

regression model, it could be possible to distinguish the relative strength of these relationships on the retirement planning.

The next Table 4 shows the relationship between the performance on the basic questions and the retirement planning status. The columns (3), (4), and (5) represent percentages of correct or wrong answers for different retirement planning status out of total answers on each class. For example, the cell for “Correct Answer Group” in Interest Rate Question and “No plan” shows 25.1%, and it indicates that the number of people who has no retirement plan among people answered correct on the interest rate question is 122 (25.1% of 486 correct answers). The columns (3), (4), and (5) represent percentages of answers out of total respondents in the different retirement planning status. For example, the cell for “Correct Answer Group” in Interest Rate Question and “No Plan” shows 47.66%, and it indicates 47.66% (122) of total respondents who have no retirement plans (256) answered correct. The ratios for “Correct Answer Group” to “Wrong Answer Group” in the Interest Rate Question as seen in the columns (3), (4), and (5), are 0.91 for “No Plan”, 1.74 for “Will Plan”, and 1.73 for “Already Planned.” The similar trend of the ratios can be found in Inflation and Risk questions. The “Will plan” group has highest probabilities of correct and lowest probabilities of wrong answers on these questions, independently. The understanding of these basic questions may have a positive impact on the retirement planning. It may also be true as some studies had shown the possibility that the retirement planning may cause better financial knowledge. Those who planned the retirement may have a better knowledge in financial issues. Majority of previous studies, however, provided evidences that the causality goes from financial knowledge to retirement planning. The causality and the possibility of joint determination in the relationship between financial literacy and retirement planning will be discussed further in the regression analysis section.

**Table 4**

Distribution of Answers on Basic Financial Literacy Questions among Groups of Retirement Planning Status

(All values are percent of total respondents within its own class)

(1)	(2)	(3)	(4)	(5)	(3)'	(4)'	(5)'
Literacy Questions	Class	No Plan (256)	Will plan (241)	Already Planned (333)	No Plan (256)	Will plan (241)	Already Planned (333)
Interest Rate Question	Correct Answer Group (486)	25.10%	31.48%	43.42%	47.66%	63.49%	63.36%
	Wrong Answer Group (344)	38.95%	25.58%	35.47%	52.34%	36.51%	36.64%
Inflation Question	Correct Answer Group (458)	27.07%	30.79%	42.14%	48.44%	58.51%	57.96%
	Wrong Answer Group (372)	35.48%	26.88%	37.63%	51.56%	41.49%	42.04%
Risk Question	Correct Answer Group (321)	26.17%	33.33%	40.50%	32.81%	44.40%	39.04%
	Wrong Answer Group (509)	33.79%	26.33%	39.88%	67.19%	55.60%	60.96%
All 3 Questions Correct Group (166)		22.89%	31.93%	45.18%	14.84%	21.99%	22.52%
None Correct Group (152)		42.76%	25.66%	31.58%	25.39%	16.18%	14.41%

Note: Elements in columns (3), (4), and (5) are percentages of total numbers in classes, (2), whereas elements in columns (3)', (4)', and (5)' are percentages of three retirement planning status.

#### 4. The Causality between Retirement Planning and Financial Literacy

Many evidences are presented in the previous studies in favor of the joint determination between literacy level and retirement planning. People with higher financial literacy level may plan their retirement better. At the same time, those who already planned or at least considering the retirement plan may acquire knowledge about financial matters and, therefore, perform better in answering those basic literacy questions. If the literacy level and retirement planning are jointly determined, then instrumental variables are required in the estimation procedure to acquire unbiased estimates for the parameters. Financial literacy levels may be determined by respondents' various background information such as Gender (Female = 0, Male = 1), Ethnicity (Kazakh = 0, Non-Kazakh = 1), Hometown (Village = 0, Cities = 1), Marital Status (Single = 0, Non-Single = 1), and Business Education (Less than half year = 0, More than half year = 1), either independently or jointly. And these variables are predetermined, and cannot be affected by the financial literacy level. In addition, these profile factors may be useful in predicting retirement planning status, also. Therefore, these profile variables are used as instruments.

Initially, the following Two Stage Least Square (2SLS) regressions are estimated for both literacy level and retirement planning status, independently:

$$RP = \beta_0 + \beta_1 \cdot LS + \varepsilon \dots\dots\dots(1)$$

$$LS = \gamma_0 + \gamma_1 \cdot RP + \omega \dots\dots\dots(2)$$

where RP is retirement planning status ranging 0 and 1 (0 for “No plan,” 1 for “Will plan” and “Already planned”),

LS is the basic literacy score ranging 0 – 3,

$\beta$  and  $\gamma$  are parameters to be estimated,

$\varepsilon$  and  $\omega$  are error terms assumed i.i.d.

In both equations, five profile variables are used as instruments in the first stage estimations. And, the hypotheses to be tested in this model will be whether the estimated parameters are statistically significant.

Since both equations for RP and LS share the same instruments in the estimation, the error terms,  $\varepsilon$  and  $\omega$  may be correlated. To utilize this correlation and attempt to acquire more efficient estimates of the parameters, these two equations are estimated simultaneously in the three-stage least square (3SLS) framework also.

The following Table 5 provides both the 2SLS and 3SLS regression results. In 2SLS estimations, the financial literacy level does not affect retirement planning status and the retirement planning status does not affect financial literacy level. The constants for both equations are significant, showing 0.57 and 1.12 for retirement planning and financial literacy equations, respectively. On the other hand, utilizing the correlations of error terms between two equations in 3SLS estimation, the financial literacy affects the retirement planning positively in Kazakhstan, showing the coefficient of 0.184 (1% significance level).



**Table 5**

2SLS and 3SLS Estimations of Literacy Score and Retirement Planning Status

	2SLS		3SLS	
	Dependent Variable		Dependent Variable	
Independent Variable	Retirement Planning	Basic Literacy Score	Retirement Planning	Basic Literacy Score
<b>Constant</b>	<b>0.570 ***</b>	<b>1.120 ***</b>	<b>0.413 ***</b>	<b>0.777 ***</b>
t-Stat	<b>6.585</b>	<b>4.986</b>	<b>4.92</b>	<b>3.572</b>
<b>Basic Literacy Score</b>	0.076		<b>0.184 ***</b>	
t-Stat	1.311		<b>3.273</b>	
<b>Retirement Planning</b>		0.503		<b>1.006 ***</b>
t-Stat		1.544		<b>3.197</b>

Note: The significance level is represented as \* for 10%, \*\* for 5%, and \*\*\* for 1%

This result is consistent with many previous studies. In addition, the retirement planning status also affects the financial literacy level positively (coefficient is 1.006 with 1% significance level). This means that the financial literacy level and retirement planning status are jointly determined in Kazakhstan, and both variables affect each other [in Gustman (2010), an evidence of reverse causality is presented]. The coefficient for the constant in retirement planning equation is 0.413 which indicates that less than 50% probability a participant has retirement plan if he or she could not answer correctly for all three basic financial literacy questions. When the financial literacy level improves by one point, however, the retirement planning status also improves by 0.184 point toward 1.0. If a person answered all three questions correct, that person is more likely (more than 96% probability) has or plans to have the retirement plan. The financial literacy level is also improved by the retirement planning process. Without the experience of retirement planning, a participant is expected to answer less than one answer correctly (0.777 point). However, a participant either already has or plans to have the retirement plan tends to show at least one point higher score in the financial literacy level.

## **5. Conclusion**

The low level of financial literacy is linked to poor financial decision-making and less level of unspent income, and a greater financial literacy can help individuals face unexpected macroeconomic and income shocks (Klapper, Lusardi, and Panos, 2012). It seems clear that the financial literacy level in Kazakhstan is alarmingly low compared to other countries studied before. It may be due to short history of capital market and financial market development since its independence in 1991 from the former Soviet Union. Using the internationally standardized questions of measuring financial literacy level, Kazakhstan marked relatively lower scores on all three basic questions. Among the participants of the financial literacy survey, female and people with no business education and/or lower income level are the most vulnerable groups in the financial market transactions and financial planning. In addition, a person who plans or already planned retirement shows significantly higher scores in the financial literacy level.

The study also investigates the relative impacts of personal profiles on retirement planning, and finds that those who are male, non-single, having some business education and with higher income tend to have better retirement planning status than those who are female, single, having no business education and making lower income. The social safety nets are relatively shallow in Kazakhstan compared to most of its trading partners, and a significant international shock such as a sudden drop of oil price may impact these vulnerable groups the most negatively. Without a proper preparation of retirement and eroding asset values of recent time, these groups will face significant economic challenges in the future once their working ages are passed.

Finally, the study investigates the relationship between the retirement planning and financial literacy level focusing the causality of one variable on another. The results show

that both financial literacy level and retirement planning jointly determined in Kazakhstan. Those who have higher level of financial literacy tend to plan better on their retirement lives while those who plan and already have retirement plans tend to show higher level of financial knowledge.

The recent heated debate and reform on the pension system in Kazakhstan probably contributed significantly in informing the public about the importance of planning early and prudently for their retirements. However, those vulnerable groups may still show lack of understanding of the consequences of the pension reform which emphasizes self-responsibility and the pains that they will face by being unprepared. For the smooth and successful transition toward the new pension system, one of the most important government initiatives should be improving the basic financial literacy level, especially through experimental education and training methods using case studies and hands on exercises for those vulnerable groups.

## 6. References

- Agnew, J., Bateman, H., and Thorp, S. (2013). Financial literacy and retirement planning in Australia. *Numeracy*, 6-2, Article 7, 1-25.
- Alexander, G., Jones, J., and Nigro, P. (1997). Investor self-selection: Evidence from a mutual fund survey, *Managerial and Decision Economics*, 18, 719-729.
- Beckmann, E. and Stix, H. (2014). Foreign currency borrowing and knowledge about exchange rate risk. *Working Paper 188*, Oesterreichische Nationalbank, 1-30.
- Boisclair, D., Lusardi, A., and Michaud, P. (2014). Financial literacy and retirement planning in Canada, *Working Paper 2014s-35*, CIRANO, 1-29.
- Bucher-Koenen, T. and Lusardi, A. (2011). Financial literacy and retirement planning in Germany, *Working Paper 17110*, NBER, 1-26.
- Clark, R., Lusardi, A., and Mitchell, O. (2014). Financial Knowledge and 401(K) Investment Performance, *Working Paper 20137*, NBER, 1-27.
- Gustman, A., Steinmeier, T., and Tabatabai, N. (2010). Financial Knowledge and Financial Literacy at the Household Level, *Working Paper 16500*, NBER, 1-49.
- Jappelli, T. and Padula, M. (2013). Investment in financial literacy and saving decisions, *Journal of Banking and Finance* 37, 2779-2792
- Klapper, L., Lusardi, A., and Panos, G. (2012). Financial Literacy and the Financial Crisis, *The World Bank Working Paper 5980*, 1 – 53, 2012
- Klapper, L. and Panos, G. (2011). Financial literacy and retirement planning: The Russian case, *Policy Research Working Paper 5827*, The World Bank, 1-22.
- Lusardi, A. and Mitchell, O. (2014). The Economic Importance of Financial Literacy: Theory and Evidence, *Journal of Economic Literature*, 52, 5-44.
- Lusardi, A. and Mitchell, O. (2011). Financial literacy and retirement planning in the United States, *Working Paper 17108*, NBER, 1-27.
- Van Rooij, M., Lusardi, A., and Alessie, R. (2011). Financial Literacy and retirement planning in the Netherlands, *Journal of Economic Psychology*, 32, 593-608.
- Van Rooij, M., Lusardi, A., and Alessie, R. (2011). Financial literacy and stock market participation, *Journal of Financial Economics*, 101, 449-472.